

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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SERIAL NO.: 10/551,534

ART UNIT: 2886

FILED: September 19, 2006

EXAMINER: Punnoose, R. M.

TITLE: METHOD AND DEVICE FOR ANALYSIS OF THE STRUCTURE AND THE COMPOSITION OF CULTURED HEDGES SUCH AS FOR EXAMPLE ROWS OF VINES

Amendment A: REMARKS

Upon entry of the present amendments, previous Claims 1 - 21 have been canceled and new Claims 22 - 38 substituted therefor. Reconsideration of the rejections, in light of the forgoing amendments and present remarks, is respectfully requested. The present amendments have been entered for the purpose of placing the claim language into a more proper U.S. format and for the purpose of more clearly distinguishing the present invention from the prior art.

In the Office Action, it was indicated that Claims 1 - 21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Bacchini European patent in view of the known prior art. Additionally, Claim 8, 16 and 21 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 7 and 10 were objected to for minor informalities.

As an overview to the present reply, Applicant has revised previous Claims 1 - 21 in the form of new Claims 22 - 38. In particular, new independent Claim 22 reflects the limitations found in previous independent Claim 1. New independent Claim 29 reflects the limitations of previous independent Claim 9. In each of these independent claims, the "machine" has been positively recited. As such, each the new independent claims specifies that the artificial vision system is mounted forwardly of the machine. The processing means is identified as processing "blockages of

"light" so as to determine the position of the hedgerows and the stakes of the hedgerows. Applicant respectfully contends that these features serve to distinguish the present invention from the prior art.

It is clear in the independent claims that the artificial vision system operates by utilizing the direct transmission of light from the light emitter to the light receiver. The processing means produces information that is generated by light blockages between the emitters and the receivers. The emitters and receivers face each other on the opposite sides of the planted hedgerow.

In the Examiner's analysis, it is stated on page 3, paragraph 7(a) that:

Bacchini et al. (Bacchini hereafter) teaches of an apparatus for analysis of the structure of cultivated hedgerows adapted to a machine that is mobile in continuous operation in trained and/or staked plantations, such as vineyards, (see Figure 3) comprising: utilizing an artificial vision system functioning by direct transmission to determine blockages of light between one or more emitters 6 and one or more receivers 15 placed facing each other, on either side of the hedgerow, and handling information produced by these blockages of light by an electronic analysis system 10 programmed or configured to examine the elements of the structure of the hedgerow 13 (see paragraphs [0015] - [0050]).

Applicant respectfully disagrees with this analysis. The Bacchini reference was cited in the original specification (see page 6, lines 10 - 21 and page 7, lines 1 - 19). As such, the Applicant is well aware of the Bacchini reference. The independent claims have been specifically introduced so as to distinguish the present invention from this Bacchini reference.

The Bacchini patent describes a cutting apparatus comprising at least one image reading device (6) that allows one to determine the position of the plant in relation to an actual cutting apparatus (3) and a processing unit (10) intended to send command signals for the adjustment of the position of said cutting device in accordance with the images taken of the stem of said plant. The apparatus described in the Bacchini reference operates upon the acquisition of images or the taking

of "photographs" of the plant. It is through the use of the television camera and the processing of the images thereof that the Bacchini patent achieves its results. The Bacchini reference does not use an artificial vision system which utilizes direct transmission and reception of light so as to cause light blockages between emitters and the receivers. Quite clearly, in the present invention, and as defined by the independent claims, the emitters and receivers are positioned on opposite sides of the hedgerow and are configured so as to direct light directly from the emitter to the receiver.

In the process described in the Bacchini reference, there is a device which acquires images through television cameras. This has nothing to do with the present invention which operates by direct transmission of light and from the reception of blockages by a processing means. The Bacchini patent does not allow one to determine light blockage between emitters and receivers. The Bacchini patent does not teach or suggest the placement of the emitters and receivers on opposite sides of the hedgerow. Additionally, and furthermore, the Bacchini patent fails to show that the light blockages are processed by the "processing means" so as to examine the elements of the hedge structure.

Applicant respectfully contends that the sheet 15 of the Bacchini reference cannot be construed as "an emitter" of light combined with a "receiver" of light so as to allow for the determination of the blockages between the emitters and the receivers.

In particular, in paragraph [0045] of the Bacchini reference, it is stated that:

[0045] Furthermore, the TV cameras, which are generally tilted upward so as to frame the stem or branches thus having the sky as background, for even greater uniformity (especially to avoid direct glare from the sun when it has the same orientation as the TV camera) can have as a background a sheet of a uniform color fixed to the supporting structure which is rigidly coupled to the means of transport. The sheet, designated by the reference numeral 15 in Figure 3, therefore allows providing protection and light screening.

As such, it is clear that the sheet 15 is not and cannot be compared to an emitter of light. It is only a sun-shield that affords protection against glare from the sun. To fulfill its function, this sun-shield 15 must be of a uniform color with a minimal reflecting capability. Even if one would assume that such a sun-shield might be capable of receiving and returning (and not of emitting) light, the blockage of these rays would be without effect since the process of the Bacchini reference does not operate by "blockage" of light but rather by the acquisition of images through cameras. As such, the Bacchini reference cannot have the "light receivers" of the emitter-receiver system.

The machine that is described in the Bacchini reference does not operate in direct transmission . The background (i.e. sheet 15) is utilized so that the information issued by other objects located behind the cultivated hedgerow (e.g. the tractor, the tree, etc.) does not interfere with the image acquired by the cameras by adding itself to that of the hedgerow. The background does not function in the nature of a light source but as a protection screen against the rays issued by objects located behind the hedgerow and against the rays coming directly from the sun. Also, the system can function without a screen and can use the sky as background (see column 3, lines 17 - 27). The camera utilizes the luminous ambient rays reflected by the hedgerow and ignores the other rays.

In the Bacchini reference, the screen (i.e. sheet 15) and the image-acquisition devices 6 are not placed facing each other on opposite sides of the fruit-bearing hedgerow. On the contrary, if the two television cameras (6) are placed on both sides of the row of plants (8), they are not placed facing each other. The screen (15) is positioned above the row.

Functionally, the Bacchini patent does not specifically teach or suggest the processing or analyzing during the day or night. The present invention can analyze the structure of the elements

of the hedgerow in either daylight conditions or nighttime conditions. As such, the present invention is able to achieve advantages that cannot be achieved by the Bacchini reference, in particular, by operating under nighttime conditions. Even though it is suggested that the Bacchini reference could function at night, the source of light is neither shown nor suggested. There is no way that the light source can be the sun shield 15.

Fundamentally, the present invention does not exploit "reflected" rays but rather "blocked rays". The present invention does not utilize, in any way, the light coming from the sun (direct or indirect) and actually teaches against the desirability of sunlight. The light of the present invention solely comes from the emitter so that the receiver can receive that particular frequency of light from the emitter. The frequency is chosen so that the sunlight is less likely to interfere with the proper operation of the present invention. As such, the Applicant respectfully contends that the present invention is patentably distinguishable from the Bacchini patent.

The present invention offers a system that functions, by direct transmission, so as to allow one to determine light blockages between the emitters and the receivers. As such, the present invention operates with its own light and with light that is specific to the receivers and the emitters. This achieves several important advantages that are not shown nor suggested by the prior art. One of the advantages is that the present invention does not require daylight or a substitute lighting source. The present invention can operate under strong sunlight, without the use of a protection screen. The present invention can also function at night. The present invention is not limited to merely the trimming of the vine or analog bushes, but can be extended to all mobile machinery intended to work continuously in staked plantations, such as soil cultivators, plant treatment machinery, fruit-picking machinery, etc. As such, the Bacchini patent fails to show or suggest the

present invention as defined by independent Claims 22 and 29 herein.

Throughout the present claims, Applicant has revised the original claim language so as to place the claim language into a more proper U.S. format, including proper antecedent bases and proper structural interrelationships throughout. Any indefinite terminology found in the original claim language has been corrected herein. Also, Applicant has deleted the objectionable Claims 7, 8, 16 and 21 in view of the Examiner's comments.

Dependent Claims 23 - 28 correspond, respectively, to the limitations found in previous Claims 2 - 7. Dependent Claims 30 - 34 correspond, respectively, to the limitations found in previous dependent Claims 10 - 14. Dependent Claims 35 - 38 correspond, respectively, to the limitations found in previous dependent Claims 17 - 20.

Based upon the foregoing analysis, Applicant contends that independent Claims 22 and 29 are now in proper condition for allowance. Additionally, those claims which are dependent upon these independent claims should also be in condition for allowance. Reconsideration of the rejections and allowance of the claims at an early date is earnestly solicited. Since no new claims have been added above those originally paid for, no additional fee is required.

Respectfully submitted,

August 26, 2009
Date

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